

ADMINISTRATIVE NOTE: **NEW REQUIREMENTS/PROCEDURES**

BAA 02-14 PROPOSER INFORMATION PAMPHLET

The Defense Advanced Research Projects Agency (DARPA) often selects its research efforts through the Broad Agency Announcement (BAA) process. The BAA will be posted directly to FedBizOpps.gov, the single government point-of-entry (GPE) for Federal government procurement opportunities over \$25,000. The following information is for those wishing to respond to the Broad Agency Announcement.

SOFTWARE FOR DISTRIBUTED ROBOTICS (SDR) INDOOR RECONNAISSANCE EXPERIMENT/DEMONSTRATION, SOL BAA 02-14, DUE: 04/01/03; POC: DR. DOUGLAS W. GAGE, DARPA/ITO; FAX: (703) 522-7161

The Defense Advanced Research Projects Agency (DARPA) is soliciting proposals for the demonstration of a distributed robotic system to address indoor reconnaissance applications. Experiments should be proposed to assess the mission level performance of the distributed robotic system. Establishing the sensitivity of system level performance to specific task details and to system design decisions is of special interest. The system will be comprised of at least 100 small mobile robots, user interface(s), and any other required system level components. Baseline performance levels will be established using a system of fixed-location sensors. Indoor reconnaissance is a military application domain of increasing importance in a world of MOUT (Military Operations in Urban Terrain), special operations, and counter terrorism.

The Software for Distributed Robotics (SDR) program is developing software to coordinate behaviors and provide user interfaces for systems of thousands of small robots. This will enable large ensembles of extremely resource-limited small robots to perform useful tasks in the real world. It will also permit humans to task and query the system as a collective, without having to interact with robots individually. The SDR Program was initiated under DARPA BAA 99-20 with initial research projects addressing the technical areas of coordinated behaviors, communications between robots, human-robot interface, and computational architecture. The projects are described online at <http://www.darpa.mil/ito/research/sdr/projlist.html>. Research to date in distributed robotics has been driven principally by technology push. The ultimate vision is to develop a system that addresses a real world application and is suitable for production and deployment.

This solicitation seeks proposals that address the following tasks:

- Detailed specification of the reconnaissance missions/functions to be addressed, the target capabilities, and the relevant metrics and measures of performance. It is critically important to precisely specify the mission functionality to be addressed because the design space for distributed systems is highly dimensioned, and the choice of the “best” solution depends critically on the details of the application requirements.

- The design and implementation of the test bed system to support the experiments and demonstration, including analysis and/or simulation to establish target performance goals.
- Planning and execution of experiments. Multiple mission scenarios may be proposed. Scenarios are encouraged that address multiple types of targets (e.g., human intruders, sound sources, chemicals) and of tasks (e.g., covertly to locate a single target, to locate places where targets are concentrated, or to proof an area to ensure that no targets are present).
- Planning and execution of the demonstration. A final system demonstration should be proposed that addresses a “locate and protect” scenario incorporating the following elements. An object of value is believed to be located within a large single story previously unexplored building. Opposing forces may or may not be present in the vicinity. The task is to deploy the system to locate the object of value, and then “protect” it by detecting, tracking, and reporting the position of any intruders who may enter the space, for a period of at least 24 hours. Apart from possible opposing force intruders, no humans or other moving entities are present except for the system operators, who are restricted to a single base location from which the robots are deployed. Robots are permitted to return to the base station for manual recharging. Fixed baseline performance will be established only for the “protect” phase by using manually deployed stationary robots as fixed sensors. The demonstration may incorporate multiple types of physical robots.
- Assessment of experimental and demonstration results. System performance metrics and lessons learned should be captured and presented in a final report.

The design and implementation task above should address the following research areas:

- Development of the behaviors of the individual robots, and the resulting system-level functionality, to support the complete mission cycle of preparation, programming, deployment, execution, monitoring and intervention, and recovery/disposal.
- Specification and development of needed communications/coordination capabilities for the robot ensemble to execute the task.
- Development of the user interface, to include a coherent user’s model of the system’s functional capabilities and expected performance levels, as well as the means to program the system for a specific mission task sequence, to monitor its performance in real time, and to assess its performance when it has completed its mission.
- Utilization of existing robot assets is highly encouraged to minimize cost and technical/schedule risks.

PROGRAM SCOPE

Proposed efforts should cover an 18-month period of performance. The project schedule should include a kick-off meeting within a month of the award date, in-progress reviews at 6-month intervals, and multiple experiments and a final demonstration. Up to \$2 M may be available for

the remaining FY2002 fiscal year. Up to two awards are anticipated, and teaming is highly encouraged.

Proposed research should investigate innovative approaches and techniques that lead to or enable revolutionary advances in the state-of-the-art. Proposals are not limited to the specific strategies listed above, and alternative visions will be considered. However, proposals should be for research that substantially contributes towards the goals stated. Research should result in prototype hardware and/or software demonstrating integrated concepts and approaches. Specifically excluded is research that primarily results in evolutionary improvement to the existing state of practice or focuses on a specific system or solution. Integrated solution sets embodying significant technological advances are strongly encouraged over narrowly defined research endeavors. Proposals may involve other research groups or industrial cooperation and cost sharing. This BAA shall remain open and proposals received up to one year following this BAA's release.

SUBMISSION PROCESS

The Defense Advanced Research Projects Agency/Information Technology Office (DARPA/ITO) requires completion of a **Broad Agency Announcement (BAA) Cover Sheet Submission** for each Proposal, by accessing the URL below:

<http://www.dynCorp-is.com/BAA/index.asp?BAAid=02-14>

After finalizing the **BAA Cover Sheet Submission**, the proposer must submit the **BAA Confirmation Sheet** that will automatically appear on the web page. Each proposer is responsible for printing the BAA Confirmation Sheet and submitting it attached to the "original" and each designated number of copies. The Confirmation Sheet should be the first page of your Proposal. Failure to comply with these submission procedures may result in the submission not being evaluated.

An original and **4** copies of the full proposal, and 2 electronic copies (i.e., 2 separate disks) of the full proposal (in Microsoft Word '97 for IBM-compatible, PDF, Postscript, or ASCII format on one 3.5-inch floppy disk or one 100 MB Iomega Zip disk). Each disk must be clearly labeled with BAA 02-14, proposer organization, proposal title (short title recommended) and Copy ____ of 2. The full proposal (original and designated number of hard and electronic copies) must be submitted in time to reach DARPA by 4:00 PM (ET) **Friday, May 10, 2002**, to be considered during the initial evaluation phase. However, BAA 02-14, SOFTWARE FOR DISTRIBUTED ROBOTICS (SDR) INDOOR RECONNAISSANCE EXPERIMENTS/DEMONSTRATION will remain open until 4:00 PM (ET) **Tuesday, April 1, 2003**. Thus, proposals may be submitted at any time from issuance of this BAA through **Tuesday, April 1, 2003**. While the proposals submitted after **Friday, May 10, 2002**, deadline will be evaluated by the Government, proposers should keep in mind that the likelihood of funding such proposals is less than for those proposals submitted in connection with the initial evaluation and award schedule. DARPA will acknowledge receipt of submissions and assign control numbers that should be used in all further correspondence regarding proposals.

The typical proposal should express a consolidated effort in support of one or more technical topic areas. Disjointed efforts should not be included in a single proposal.

Restrictive notices notwithstanding: Proposals may be handled, for administrative purposes only, by a support contractor. This support contractor is prohibited from competition in DARPA technical research and is bound by appropriate non-disclosure requirements.

EVALUATION AND FUNDING PROCESSES

Proposals will not be evaluated against each other, since they are not submitted in accordance with a common work statement. DARPA's intent is to review proposals as soon as possible after they arrive; however, proposals may be reviewed periodically for administrative reasons. For evaluation purposes, a proposal is the document described in PROPOSAL FORMAT Section I and Section II (see below). Other supporting or background materials submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal.

Evaluation of proposals will be accomplished through a scientific review of each proposal using the following criteria, which are listed in descending order of relative importance:

- (1) Overall Scientific and Technical Merit: The overall scientific and technical merit must be clearly identifiable. The technical concept should be clearly defined and developed. Emphasis should be placed on the technical value of the development and experimentation approach.
- (2) Innovative Technical Solution to the Problem: Proposed efforts should apply new or existing technology in a new way advantageous to the objectives. The plan on how the offeror intends to get developed technology and information to the user community should be considered.
- (3) Potential Contribution and Relevance to DARPA Mission: The offeror must clearly address how the proposed effort will meet the goals of the undertaking. The relevance is further indicated by the offeror's understanding of the operating environment of the capability to be developed.
- (4) Offeror's Capabilities and Related Experience: The qualifications, capabilities, and demonstrated achievements of the proposed principals and other key personnel for the primary and subcontractor organizations must be clearly shown.
- (5) Plans and Capability to Accomplish Technology Transition: The offeror should provide a clear explanation of how the technologies to be developed will be transitioned to capabilities for military forces. Technology transition should be a major consideration in the design of experiments, particularly considering the potential for involving potential transition organizations in the experimentation process.
- (6) Cost Realism: The overall estimated cost to accomplish the effort should be clearly shown as well as the substantiation of the costs for the technical complexity described. Evaluation

will consider the value to Government of the research and the extent to which the proposed management plan will effectively allocate resources to achieve the capabilities proposed.

Non-government personnel may review proposals; however, contractors will not be used to conduct evaluations or analyses of any aspect of a proposal submitted under this BAA, unless one of the three conditions identified in FAR 37.203(d) applies.

The Government reserves the right to select for award all, some, or none of the proposals received. Proposals identified for funding may result in a contract, grant, cooperative agreement, or other transaction depending upon the nature of the work proposed, the required degree of interaction between parties, and other factors. If warranted, portions of resulting awards may be segregated into pre-priced options.

GENERAL INFORMATION

Proposals not meeting the format described in this pamphlet may not be reviewed. Proposals **MUST NOT** be submitted by fax or e-mail; any so sent will be disregarded. This notice, in conjunction with this pamphlet, BAA 02-14 Proposer Information Pamphlet (PIP) and all references, constitutes the total BAA. No additional information is available, nor will a formal Request for Proposal (RFP) or other solicitation regarding this announcement be issued. Requests for same will be disregarded. All responsible sources capable of satisfying the Government's needs may submit a proposal that shall be considered by DARPA. Historically Black Colleges and Universities (HBCUs) and Minority Institutions (MIs) are encouraged to submit proposals and join others in submitting proposals. However, no portion of this BAA will be set aside for HBCU and MI participation due to the impracticality of reserving discrete or severable areas of this research for exclusive competition among these entities.

NEW REQUIREMENTS/PROCEDURES: The Award Document for each proposal selected and funded will contain a mandatory requirement for submission of DARPA/ITO Quarterly Status Reports and an Annual Project Summary Report. These reports, described below, will be electronically submitted via the DARPA/ITO Technical – Financial Information Management System (T-FIMS), utilizing the government furnished Uniform Resource Locator (URL) on the World Wide Web (WWW).

- (a) Status Report: Due at least three (3) times per year – Jan, Apr, & Oct
 - 1) Technical Report
 - a) Project General Information
 - b) Technical Approach
 - Accomplishments
 - Goals
 - Significant changes / improvements
 - c) Deliverables
 - d) Transition Plan
 - e) Publications
 - f) Meetings and Presentations
 - g) Project Plans
 - h) Near term Objectives

- 2) Financial Report
- 3) Project Status / Schedule
- (b) Project Summary (PSum): Due once each fiscal year in July
 - 1) All Sections of the Status Report
 - 2) QUAD Chart
 - a) Visual Graphic
 - b) Impact
 - c) New Technical Ideas
 - d) Schedule

PROPOSAL FORMAT

Proposals shall include the following sections, each starting on a new page (where a "page" is 8-1/2 by 11 inches with type not smaller than 12 point) and with text on one side only. The submission of other supporting materials along with the proposal is strongly discouraged. Sections I and II of the proposal shall not exceed 40 pages. Maximum page lengths for each section are shown in braces { } below.

Section I. Administrative

{1} Cover Page including: (1) BAA number; (2) Technical topic area; (3) Proposal title; (4) Technical point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (5) Administrative point of contact including: name, telephone number, electronic mail address, fax (if available) and mailing address; (6) Summary of the costs of the proposed research, including total base cost, estimates of base cost in each year of the effort, estimates of itemized options in each year of the effort, and cost sharing if relevant; and (7) Contractor's type of business, selected from among the following categories: "WOMEN-OWNED LARGE BUSINESS," "OTHER LARGE BUSINESS," "SMALL DISADVANTAGED BUSINESS [*Identify ethnic group from among the following: Asian-Indian American, Asian-Pacific American, Black American, Hispanic American, Native American, or Other*]," "WOMEN-OWNED SMALL BUSINESS," "OTHER SMALL BUSINESS," "HBCU," "MI," "OTHER EDUCATIONAL," "OTHER NONPROFIT", or "FOREIGN CONCERN/ENTITY."

Section II. Detailed Proposal Information

This section provides the detailed discussion of the proposed work necessary to enable an in-depth review of the specific technical and managerial issues. Specific attention must be given to addressing both risk and payoff of the proposed work that make it desirable to DARPA.

[IMPORTANT NOTE: WITH THE EXCEPTION OF E, C THROUGH H HAVE BEEN REVISED.]

- A. {1} Innovative claims for the proposed research. This page is the centerpiece of the proposal and should succinctly describe the unique proposed contribution.

B. {1} A "Proposal Roadmap" which shall address the following nine areas that must be addressed in the proposal. For each area, the roadmap will contain a summary statement (or "sound bite") for that area and identify the page number(s) where the issue is addressed in detail. It is important to make these statements as explicit and informative as possible. The areas are:

1. Main goal of the work (stated in terms of new, operational capabilities for assuring that critical information is available to key users).
2. Tangible benefits to end users (i.e., benefits of the capabilities afforded if the proposed technology is successful).
3. Critical technical barriers (i.e., technical limitations that have, in the past, prevented achieving the proposed results).
4. Main elements of the proposed approach.
5. Specific basis for confidence that the proposed approach will overcome the technical barriers. ("We have a good team and good technology" is not a useful statement.)
6. Nature of expected results (unique/novel/critical capabilities to result from this effort, and form in which they will be defined).
7. The risk if the work is not done.
8. Criteria for evaluating progress and capabilities.
9. Cost of the proposed effort for each contract year.

C. {2} Research Objectives:

1. Problem Description. Provide concise description of problem area addressed by this research project.
2. Research Goals. Identify specific research goals of this project. Identify and quantify expected performance improvements from this research. Identify new capabilities enabled by this research. Identify and discuss salient features and capabilities of developmental hardware and software prototypes.
3. Expected Impact. Describe expected impact of the research project, if successful, to problem area.

D. Technical Approach:

1. {17} Detailed Description of Technical Approach. Provide detailed description of technical approach that will be used in this project to achieve research goals. Specifically identify and discuss innovative aspects of the technical approach.

2. {3}Comparison with Current Technology. Describe state-of-the-art approaches and the limitations within the context of the problem area addressed by this research.
- E. {3} Statement of Work (SOW) written in plain English, outlining the scope of the effort and citing specific tasks to be performed and specific contractor requirements.
- F. Schedule and Milestones:
1. {1}Schedule Graphic. Provide a graphic representation of project schedule including detail down to the individual effort level. This should include but not be limited to, a multi-phase development plan which demonstrates a clear understanding of the proposed research; and a plan for periodic and increasingly robust experiments over the project life that will show applicability to the overall program concept. Show all project milestones. Use absolute designations for all dates.
 2. {3}Detailed Individual Effort Descriptions. Provide detailed task descriptions for each individual effort in schedule graphic.
- G. {2}Deliverables Description. List and provide detailed description for each proposed deliverable. Include in this section all proprietary claims to results, prototypes, or systems supporting and/or necessary for the use of the research, results, and/or prototype. If there are no proprietary claims, this should be stated. The offeror must submit a separate list of all technical data or computer software that will be furnished to the Government with other than unlimited rights (see DFARS 227.) Specify receiving organization and expected delivery date for each deliverable.
- H. {2}Technology Transition and Technology Transfer Targets and Plans. Discuss plans for technology transition and transfer. Identify specific military and commercial organizations for technology transition or transfer. Specify anticipated dates for transition or transfer.
- I. {2} List of key personnel, concise summary of their qualifications, and discussion of proposer's previous accomplishments and work in this or closely related research areas. Indicate the level of effort to be expended by each person during each contract year and other (current and proposed) major sources of support for them and/or commitments of their efforts. DARPA expects all key personnel associated with a proposal to make substantial time commitment to the proposed activity.
- J. {1} Description of the facilities that would be used for the proposed effort. If any portion of the research is predicated upon the use of Government Owned Resources of any type, the offeror shall specifically identify the property or other resource required, the date the property or resource is required, the duration of the requirement, the source from which the resource is required, if known, and the impact on the research if the resource cannot be provided. If no Government Furnished Property is required for conduct of the proposed research, the proposal shall so state.

K. {1} Experimentation and Integration Plans. Offerors shall describe how their results could be integrated with solutions that other contractors are currently developing or are likely to develop. In addition, offerors should identify experiments to test the hypotheses of their approaches and be willing to work with other contractors in order to develop joint experiments in a common test bed environment. Offerors should expect to participate in teams and workshops to provide specific technical background information to DARPA, attend semi-annual Principal Investigator (PI) meetings, and participate in numerous other coordination meetings via teleconference or Video Teleconference (VTC). Funding to support these various group experimentation efforts should be included in technology project bids.

L. {5} Cost by task, with breakdown into accounting categories and equipment for the entire contract and for each contract year. Where the effort consists of multiple portions that could reasonably be partitioned for purposes of funding, these should be identified as contract options with separate cost estimates for each. Details of any cost sharing should also be included.

MANDATORY!

M. Contractors requiring the purchase of information technology (IT) resources as Government Furnished Property (GFP) **MUST** attach to the submitted proposals the following information:

1. A letter on Corporate letterhead signed by a senior corporate official and addressed to **Dr. Douglas Gage**, DARPA/ITO, stating that you either can not or will not provide the information technology (IT) resources necessary to conduct the said research.
2. An explanation of the method of competitive acquisition or a sole source justification, as appropriate, for each IT resource item.
3. If the resource is leased, a lease purchase analysis clearly showing the reason for the lease decision.
4. The cost for each IT resource item.

IMPORTANT NOTE: IF THE CONTRACTOR DOES NOT COMPLY WITH THE ABOVE STATED REQUIREMENTS, THE PROPOSAL WILL BE REJECTED.

Awards made under this BAA may be subject to the provisions of the Federal Acquisition Regulation (FAR) Subpart 9.5, Organizational Conflict of Interest. All affirmations must state which office(s) the offeror supports, and identify the prime contract number. Affirmations should be furnished at the time of proposal submission. All facts relevant to the existence or potential existence of organizational conflicts of interest, as that term is defined in FAR 9.501, must be disclosed in Section II, I. of the proposal, organized by task and year. This disclosure shall include a description of the action the Contractor has taken, or proposes to take, to avoid, neutralize, or mitigate such conflict.

Section III. Additional Information

A bibliography of relevant technical papers and research notes (published and unpublished) that document the technical ideas, upon which the proposal is based, may be included in the proposal submission. Provide one set for the original full proposal and one set for each of the **4** full proposal hard copies. Please note: The materials described in this section, and submitted with the proposal will be considered for the reviewer's convenience only and not considered as part of the proposal for evaluation purposes.

The administrative addresses for this BAA are:

Fax: 703-522-7161 Addressed to: DARPA/ITO, BAA 02-14

Electronic Mail: baa02-14@darpa.mil

Electronic File Retrieval: <http://www.darpa.mil/ito/Solicitations.html>

Mail to: DARPA/ITO

ATTN: BAA 02-14

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